The Third HEDS-UP Forum
May 4-5, 2000

The HEDS-UP (Human Exploration and Development of Space – University Partners) program has been instituted to build new relationships between university faculty and students and NASA in support of the Human Exploration and Development of Space. The program provides a mechanism whereby university students can explore problems of interest to NASA through student design projects, led by a university professor or mentor, and aided by the HEDS-UP staff. HEDS-UP advises on the type of project that is of interest and provides contacts to NASA and Industry professionals who may serve as mentors to the student project. Students become acquainted with objectives, strategies, development issues and technologic characteristics of space exploration programs. In doing so, they are preparing themselves for future engineering challenges and may well find that the program is on their critical path to professional advancement. Many of the ideas are novel and are of interest to NASA. Industry finds in HEDS-UP a mechanism to meet many bright and enthusiastic students, who are about to enter the work force. The universities become more involved with space exploration and the students are encouraged to include an outreach element in their work, to bring their efforts and their excitement to others in their universities or in their communities.

The climax of the HEDS-UP program each year is the HEDS-UP Forum, held at the Lunar and Planetary Institute. Here, the university teams bring their projects -–written reports, oral reports, models, prototypes and experiment demonstrations, to show to one another and to NASA and Industry participants. NASA, Industry and Academic professionals present discussions of problems of current interest to space exploration. All meet informally around the posters that each of the teams brings to the Forum.

This year the HEDS-UP Forum was held May 4-5, at the Lunar and Planetary Institute in Houston. Thirteen university teams from twelve universities participated. Eleven teams were undergraduate teams, two were composed of graduate students. Each team contributed a 20-page written report. These reports are reproduced in this report. The agenda for the Forum shows the order of presentation of the talks by the universities and by NASA and Lunar and Planetary Institute presenters. The specially invited NASA presenters included Mr. John Connolly, Dr. David McKay and Dr. Donald Henninger of the NASA Johnson Space Center, Paul Spudis and Steve Clifford of the Lunar and Planetary Institute, and Dr. Pascal Lee of the NASA Ames Research Center.

The Forum could not have been carried out without the efforts of Sharon Steahle and Kay Labuda of the Lunar and Planetary Institute and many others of the Institute staff contributed to the effort. Mike Duke and Kay Labuda took the photographs that are included in this report. Rene Dotson was responsible for the final editing.

This report, including its downloadable photos, is accessible through the HEDS-UP web site http://www.lpi.usra.edu/lpi/HEDS-UP/. The web site also includes additional information for prospective participants.

Funding for HEDS-UP has been provided by the Advanced Projects Office in the Office of Space Flight, NASA Headquarters.

The LPI staff is looking forward to the next year of HEDS-UP, in which we hope to make further improvements and involve additional university teams.

Michael B. Duke
Lunar and Planetary Institute
May 2000

HEDS-UP FORUM
LUNAR AND PLANETARY INSTITUTE
HOUSTON, TEXAS

MAY 4-5, 2000

AGENDA

Thursday, May 4

7:30 AM	Continental Breakfast
8:30	Welcome to LPI – David Black, Director
8:45	John Connolly, NASA Johnson Space Center - "Strategic Directions for HEDS"
9:30	Break
9:45	University of California, Berkeley – "The Hunt for Liquid Water, Life and Landing Sites on the Surface of Mars Today"
10:30	University of Washington – "Studies on Closed Ecosystems: Biosphere in a Bottle"
11:15	University of Texas, Austin – "Automated Construction of a Martian Base"
12:00	Lunch
1:30 PM	University of Colorado – "MARV: Mars Aerial Research Vehicle"
2:15	University of Maryland – "Project Magellan: Racing the Sun around the Moon"
3:00	California Institute of Technology – "Mars SCHEME: The Mars Society-Caltech Human Exploration of Mars Endeavor"
3:45	Break
4:00	Embry Riddle Aeronautical University – "LIRA - Lunar Interferometric Radio Array"
4:45	Wichita State University – Mars Airborne Exploration Vehicle
5:30	Posters and Reception

Friday, May 5

7:30 AM	Continental Breakfast
8:30	Colorado School of Mines – "Excavating Martian Regolith to Extract Water"
9:15	Rowan University – "A Comparison of Preliminary Design Configurations for Liquid, Solid and Hybrid Mars Ascent Vehicles using In Situ Propellants"
10:00	Break
10:15	Pennsylvania State University – "Scaling the Martian Walls of Time"
11:00	Georgia Institute of Technology – "A Moon-based Advanced Reusable Transportation Architecture: The MARTA Project"
11:45	Embry-Riddle Aeronautical University – "Red Mars - Green Mars? Martian Regolith as a Plant Growth Medium"
12:30PM	Lunch
2:00	"Exploration of the Moon", P. Spudis, LPI
2:30	"Searching for Life on Mars", D. McKay, JSC
3:00	"Drilling for Water on Mars", S. Clifford, LPI
3:30	The Haughton Crater Mars Analog, P. Lee, Ames Research Center
4:00	"Advanced Life Support for Long-Duration Missions", D. Henninger, JSC
4:30	Presentation of Awards
5:00	Adjourn